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FOCUS ISSUE ON STEMI

STATE-OF-THE-ART REVIEW

Preventive Stenting in Acute Myocardial Infarction 131
Ari Pollack, Bibhu D. Mohanty, Rishi Handa, Patrick M. Looser, Valentin Fuster, Spencer B. King III, Samin K. Sharma

Current practice guidelines advocate culprit vessel intervention alone in patients with ST-segment elevation myocardial infarction (STEMI) found to have multivessel coronary disease during primary percutaneous coronary intervention. The PRAMI (Preventive Angioplasty in Acute Myocardial Infarction) trial reinvigorated the debate on the timing of noninfarct artery intervention. In this review, the authors discuss the pathophysiology of nonculprit vessel plaque in STEMI, provide a summary of the existing literature on the topic, and discuss the PRAMI trial in the face of previous data and possible future directions for further study.

CLINICAL RESEARCH

Increasing Percutaneous Coronary Interventions for ST-Segment Elevation Myocardial Infarction in the United States: Progress and Opportunity 139
Rashmee U. Shah, Timothy D. Henry, Stephanie Rutten-Ramos, Ross F. Garberich, Mourad Tighiouart, C. Noel Bairey Merz

Health care systems emphasize rapid access to percutaneous coronary intervention (PCI) for ST-segment elevation myocardial infarction (STEMI). The authors used the Nationwide Inpatient Sample to evaluate the impact of these efforts. Using 2003 as reference, the adjusted odds ratio (OR) of PCI increased to 4.16 (95% confidence interval [CI]: 3.71 to 4.66) by 2011, and the adjusted OR of in-hospital death decreased to 0.79 (95% CI: 0.74 to 0.84). After accounting for PCI, the OR of death was 1.01 in 2011 (95% CI: 0.95 to 1.07) compared with 2003. In summary, the PCI rate increased from 2003 to 2011, and PCI was a mediator of decreasing STEMI mortality in this nationally representative sample.

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Double-Blind, Randomized, Prospective Comparison of Loading Doses of 600 mg Clopidogrel Versus 60 mg Prasugrel in Patients With Acute ST-Segment Elevation Myocardial Infarction Scheduled for Primary Percutaneous Intervention: The ETAMI Trial (Early Thienopyridine treatment to improve primary PCI in Patients with Acute Myocardial Infarction) 147

Uwe Zeymer, Hans-Christian Mochmann, Bernd Mark, Hans-Richard Arntz, Holger Thiele, Frank Diller, Gilles Montalescot, Ralf Zahn

This double-blind, prospective study randomized 62 patients with ST-segment elevation myocardial infarction scheduled for primary percutaneous coronary intervention in the ambulance or the emergency department to 60 mg prasugrel (n = 31) or 600 mg clopidogrel (n = 31). The primary endpoint platelet reactivity index (PRI) after 2 h (50.4 ± 32.7% vs. 66.3 ± 22.2%; p = 0.035) and after 4 h (39.1 ± 27.5% vs. 54.5 ± 49.3%; p = 0.038) were significantly lower with prasugrel compared with clopidogrel. In addition, the rate of patients with a PRI <50% tended to be higher with prasugrel compared with clopidogrel after 2 h (46.7% vs. 28.6%, p = 0.15) and after 4 h (63.0% vs. 38.9%, p = 0.06).

Prophylactic Warfarin Therapy After Primary Percutaneous Coronary Intervention for Anterior ST-Segment Elevation Myocardial Infarction 155

Michel R. Le May, Sudikshya Acharya, George A. Wells, Ian Burwash, Aun Yeong Chong, Derek Y. So, Chris A. Glover, Michael P.V. Froeschl, Benjamin Hibbert, Jean-François Marquis, Alexander Dick, Melissa Blondeau, Jordan Bernick, Marino Labinaz

This study sought to determine the benefits of adding warfarin therapy to dual-antiplatelet therapy in patients with apical akinesis or dyskinesis on transthoracic echocardiography after primary percutaneous coronary intervention (PCI). Of the 460 patients who qualified, 131 were discharged on warfarin and 329 without warfarin. Net adverse clinical events (NACE) at 180 days occurred more frequently in the no warfarin group (14.7% vs. 4.6%, p = 0.001). On propensity score analysis, warfarin therapy was an independent predictor of NACE (odds ratio: 4.01, 95% confidence interval: 2.15 to 7.50, p < 0.0001). Our results do not support the addition of warfarin therapy after primary PCI in patients with apical akinesis or dyskinesis.

■ EDITORIAL COMMENT

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Michael C. McDaniel

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Relationship Between Time to Invasive Assessment and Clinical Outcomes of Patients Undergoing an Early Invasive Strategy After Fibrinolysis for ST-Segment Elevation Myocardial Infarction: A Patient-Level Analysis of the Randomized Early Routine Invasive Clinical Trials 166

Mina Madan, Sigrun Halvorsen, Carlo Di Mario, Mary Tan, Cynthia M. Westerhout, Warren J. Cantor, Michel R. Le May, Francesco Borgia, Federico Piscione, Bruno Scheller, Paul W. Armstrong, Francisco Fernandez-Aviles, Pedro L. Sanchez, John J. Graham, Andrew T. Yan, Shaun G. Goodman

This study investigated the relationship between time to invasive assessment and clinical outcomes among ST-segment elevation myocardial infarction patients randomized to a routine early invasive strategy after fibrinolysis. Early angiography (<4 h) and a shorter symptom onset to angiography time (<4 h) were not associated with an increased risk of 30-day death or reinfarction or in-hospital major bleeding and were associated with lower 30-day recurrent ischemia. A shorter symptom onset to angiography time was associated with reduced 1-year death or reinfarction.

SEE ADDITIONAL CONTENT ONLINE

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Beyond the Guidelines Stance: Green Light for Very Early Angiography After Fibrinolysis 175

Giuseppe Tarantini

Remote Ischemic Conditioning Reduces Myocardial Infarct Size and Edema in Patients With ST-Segment Elevation Myocardial Infarction 178

Steven K. White, Georg M. Frohlich, Daniel M. Sado, Viviana Maestrini, Marianna Fontana, Thomas A. Treibel, Shana Tehrani, Andrew S. Flett, Pascal Meier, Cono Ariti, John R. Davies, James C. Moon, Derek M. Yellon, Derek J. Hausenloy

Whether remote ischemic conditioning (RIC) using transient arm ischemia and reperfusion can reduce acute myocardial infarct (MI) size, assessed by cardiovascular magnetic resonance (CMR), in ST-segment elevation myocardial infarction treated by primary percutaneous coronary intervention is unknown. Patients randomly received either RIC (four 5-min cycles of arm cuff inflation/deflation) or control (uninflated cuff) protocols prior to primary percutaneous coronary intervention. The authors found that RIC significantly reduced MI size on CMR by 27% when compared with the control protocol. Because RIC also decreased the extent of myocardial edema by 17% (measured by T_2-mapping CMR), we were unable to delineate the area at risk and calculate myocardial salvage.

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Absorb Bioresorbable Vascular Scaffold Versus Everolimus-Eluting Metallic Stent in ST-Segment Elevation Myocardial Infarction: 1-Year Results of a Propensity Score Matching Comparison: The BVS-EXAMINATION Study (Bioresorbable Vascular Scaffold-A Clinical Evaluation of Everolimus Eluting Coronary Stents in the Treatment of Patients With ST-segment Elevation Myocardial Infarction) 189

Salvatore Brugaletta, Tommaso Gori, Adrian F. Low, Petr Tousek, Eduardo Pinar, Josep Gomez-Lara, Giancarla Scalone, Eberhard Schulz, Mark Y. Chan, Viktor Kocka, Jose Hurtado, Juan Antoni Gomez-Hospital, Thomas Münzel, Chi-Hang Lee, Angel Cequier, Mariano Valdés, Petr Widimsky, Patrick W. Serruys, Manel Sabaté

Recent studies, limited by lack of a control group and small sample size, have shown short-term safety and feasibility of bioresorbable vascular scaffold (BVS) implantation in ST-segment elevation myocardial infarction (STEMI) patients. Our study compared the 1-year outcome of STEMI patients treated by BVS with propensity-score matched STEMI patients treated either by everolimus-eluting stent (EES) or by bare-metal stent (BMS). It showed that STEMI patients treated with BVS had similar rates of device-oriented endpoint compared with those treated with EES or BMS, although the rate of scaffolds thrombosis, mostly clustered in the early phase, was not negligible. Larger studies with longer follow-up are needed to confirm our findings.

SEE ADDITIONAL CONTENT ONLINE

■ EDITORIAL COMMENT

Bioresorbable Drug-Eluting Stents: An Immature Technology in Need of Mature Application 198

Robert A. Byrne, Adnan Kastrati

Comprehensive Meta-Analysis of Safety and Efficacy of Bivalirudin Versus Heparin With or Without Routine Glycoprotein IIb/IIIa Inhibitors in Patients With Acute Coronary Syndrome 201

Eliano Pio Navarese, Volker Schulze, Felicita Andreotti, Mariusz Kowalewski, Michalina Kołodziejczak, David E. Kandzari, Tienush Rassaf, Bartosz Gorny, Maximilian Brockmeyer, Christian Meyer, Sergio Berti, Jacek Kubica, Malte Kelm, Marco Valgimigli

This meta-analysis compared bivalirudin with heparin with or without a routinely administered glycoprotein IIb/IIIa inhibitor (GPI) in patients with acute coronary syndrome. Thirteen randomized, controlled trials were included. There was a reduction of major bleeding with bivalirudin compared with heparin that was significant when heparin was routinely administered with GPI ($p < 0.001$) but not with provisionally administered GPI ($p = 0.24$). Stent thrombosis significantly increased with bivalirudin compared with heparin plus routine GPI use ($p = 0.02$), but not heparin plus provisional GPI use ($p = 0.42$). Bivalirudin in acute coronary syndrome patients is associated with a reduction of major bleeding compared with heparin with routinely administered GPI, but with an increase in stent thrombosis rates compared with heparin with or without GPI.

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Peter Clemmensen, Sebastian Wiberg, Arnoud van't Hof, Efthymios N. Deliargyris, Pierre Coste, Jurrien ten Berg, Claudio Cavallini, Martial Hamon, Dariusz Dudek, Uwe Zeymer, Xavier Tabone, Steen D. Kristensen, Debra Bernstein, Prodromos Anthopoulos, Jayne Prats, Philippe Gabriel Steg

The EUROMAX (European Ambulance Acute Coronary Syndrome Angiography) trial demonstrated a significant decrease in death and major bleeding with bivalirudin compared with heparin with optional glycoprotein IIb/IIIa inhibitors, but an increase in acute stent thrombosis (AST). This analysis confirms that the risk for AST is limited to the first few hours after primary percutaneous coronary intervention (PCI) and that neither the new oral $P2Y_{12}$ inhibitors nor a low-dose (0.25 mg/kg/h) bivalirudin infusion are protective. However, prolonging the bivalirudin infusion at the full PCI dose was not associated with a higher risk of AST while maintaining the lower bleeding rates, suggesting that this strategy could potentially further optimize outcomes in primary PCI.

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